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Laser scanning sensor

User Manual

DE-45xx

V1.3.1

Manufacturer Dongxingsong Technology Co., Ltd.

10/2022

Thank you for choosing our company's products. Please read this manual carefully before use.

Version Announcement

Document Version	Applicable firmware version	Add/Remove Information
V1.0		release
V1.2		Add regional data acquisition
V1.3		Corrected the line color definition to be the same as the actual line definition.
V1.3.1		Add version information retrieval

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1.1 Applicable Environment Notes

⚠ Steam, smoke, dust, and visible particles in the air can all cause sensors to make incorrect judgments or even become unusable.

⚠ Qualified technicians should be scheduled to regularly check whether the sensor connections and installations are correct.

⚠ The maximum service life of the sensor is10It needs to be replaced after one year, otherwise it may not meet the required performance requirements.

⚠ The sensors should be inspected and cleaned regularly.

⚠ This product may only be used within the specified limits and under the specified technical parameters and operating conditions at all times.

use.

1.2 Wiring environment considerations

❗ Do not reverse the power supply or connect it to a voltage higher than the specified maximum operating voltage, otherwise it will damage the sensor.

❗ If the power supply is connected to a voltage lower than the specified minimum operating voltage, the sensor will fail to work or malfunction.

❗ Please follow the wiring instructions in the manual; otherwise, the sensor may not be able to detect the input signal correctly.

❗ Do not connect the output signal terminal to devices that exceed the sensor's load capacity, otherwise it will cause sensor failure.

1.3 Debugging environment notes

❗ Only qualified authorized personnel are permitted to connect, install, debug, and configure the laser sensor.

❗ Confirm that the peripheral devices associated with the sensor are in a reliable shutdown state.

❗ Confirm that the debugging personnel are in a safe position.

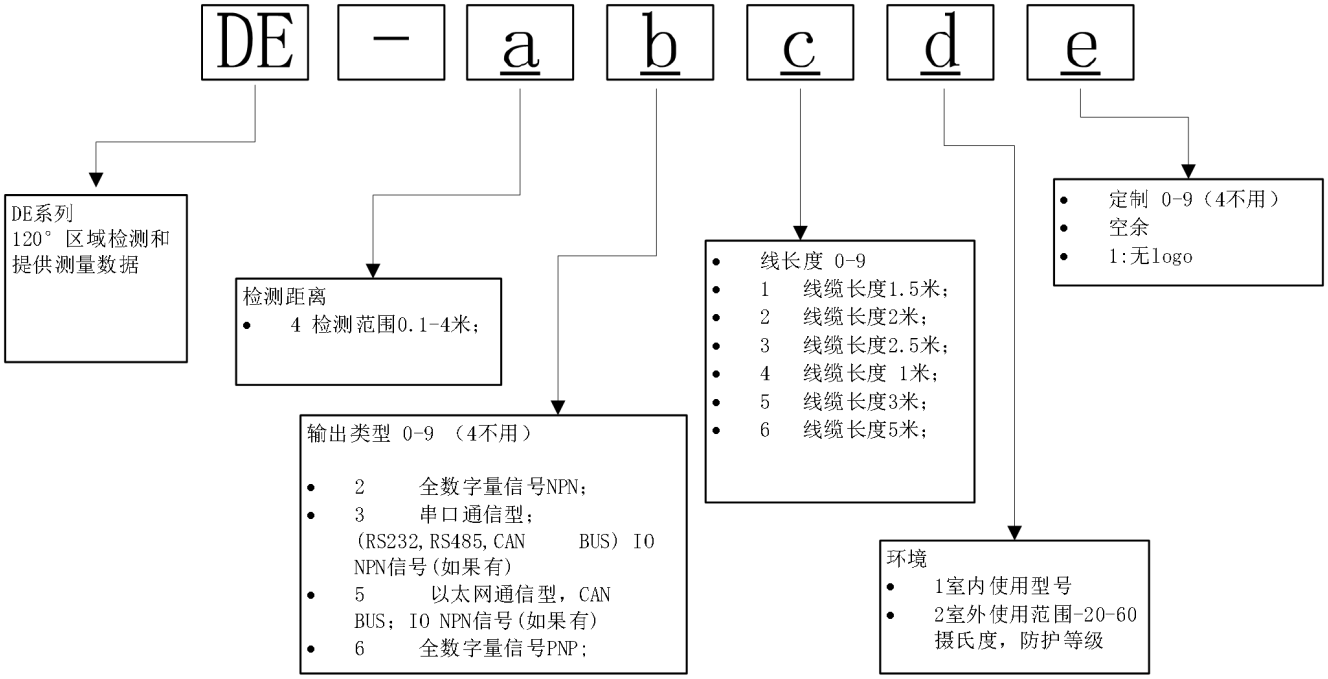
❗ Confirm that other people or objects are outside the equipment's operating range.

2.1Product Models and Specifications List

parameter / Product Model	DE-42xxx	DE-46xxx	DE-43xxx	DE-45xxx
Operating voltage	DC15-30V			
Power consumption	1W		1.2W	
Light source type	Laser (pulsed light)			
Light source level	1(IEC 60825-1:2014,EN 60825-1:2014)			
wavelength	905nm			
Pulse width	5ns			
Measurement methods	Pulse ranging technology (PRT)			
Light resistance	Resistant to sunlight (⩽80000 Lux)			
Detection range	0.1-1.5rice(10%(reflectivity)			
	0.1-4rice(90%(reflectivity)			
Angular resolution	0.5°			0.1°、0.2°Software configurable
Recognizable object shapes	Arbitrary shape, resolution calculated based on sensing distance			
Output raw measurement data?	Not supported		support	
digital input	4input (NPNenter)	4input (PNPenter)	none	
Switch output	4One output (NPN(output)	4One output (PNP(output)	4One output (NPN(output)	
Number of channels	0-15total16One channel		0-63total64One channel	
Configure port	USB Type-C			Ethernet
RS232	none		RS232-HS	none
RS485	none		RS485-HS/RS485-Modbus	none
CAN	none		CAN-HS/CANOPEN	none
Ethernet	none			TCP/UDP
Scan rate	The motor scanning speed is10Hz,go through4After frequency multiplication, it becomes40Hz			
Scanning angle	120°			
Laser scanning frequency	72kHz,144kHzConfigurable software			
Measurement accuracy	±4cm			
Detect output delay	0-500msConfigurable			
Detection hold delay	0-500msConfigurable			
Usage Environment	Indoor use, operating temperature (-10℃-50℃), working humidity (⩽85%RH(No water vapor condensation)			
Protection level	IP54			
Vibration resistance	10-50HzEachX,Y,Zof0.7mmDouble amplitude2Hour			
Impact resistance	196mJ/㎡, inX,Y,Zeach10Second-rate			
Indicator Lights/Action Description	Green (power indicator light) illuminates when the sensor is powered normally.			
	Yellow (output signal)1(lights), warning2This indicator light illuminates when an obstacle intrudes into the area.			
	Orange (output signal)2(lights), warning1This indicator light illuminates when an obstacle intrudes into the area.			
	Red (output signal)3(Light) This indicator light illuminates when an obstacle intrudes into the protected area.			

Cable length included	Optional
DE-42xxx:4indivualNPNInput to switch obstacle avoidance channels.4indivualNPNThe outputs are warnings.1Zone output, warning2Area output, protected area output, fault output	
DE-46xxx:4indivualPNPInput to switch obstacle avoidance channels.4indivualPNPThe outputs are warnings.1Zone output, warning2Area output, protected area output, fault output	
DE-43xxx:RS232-HS,RS485-HS,CAN-HSIt can output both digital signals and raw data.RS485-Modbus,CANOPENOnly outputs switch signals	
DE-45xxx:4indivualNPNOutput, supports EthernetTCP/UDPOutput switch signal, EthernetTCP/UDPOutput raw data	

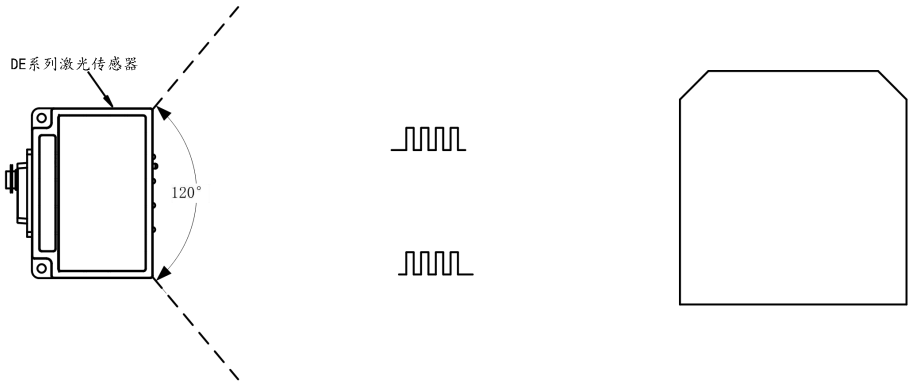
2.2Model Rules

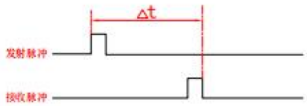


2.3Function

2.3.1 Detection principle

Laser scanning sensors are based on the time-of-flight of lasers (TIF).TOFThe measurement principle works by emitting laser beams at uniform time intervals under extremely high synchronization clock conditions. When the laser beam encounters an object, it is reflected back. The laser scanning sensor receives the reflected beam and uses the time difference Δ between emission and reception to determine the source.tTo calculate the distance from the laser scanning sensor to the obstacle.

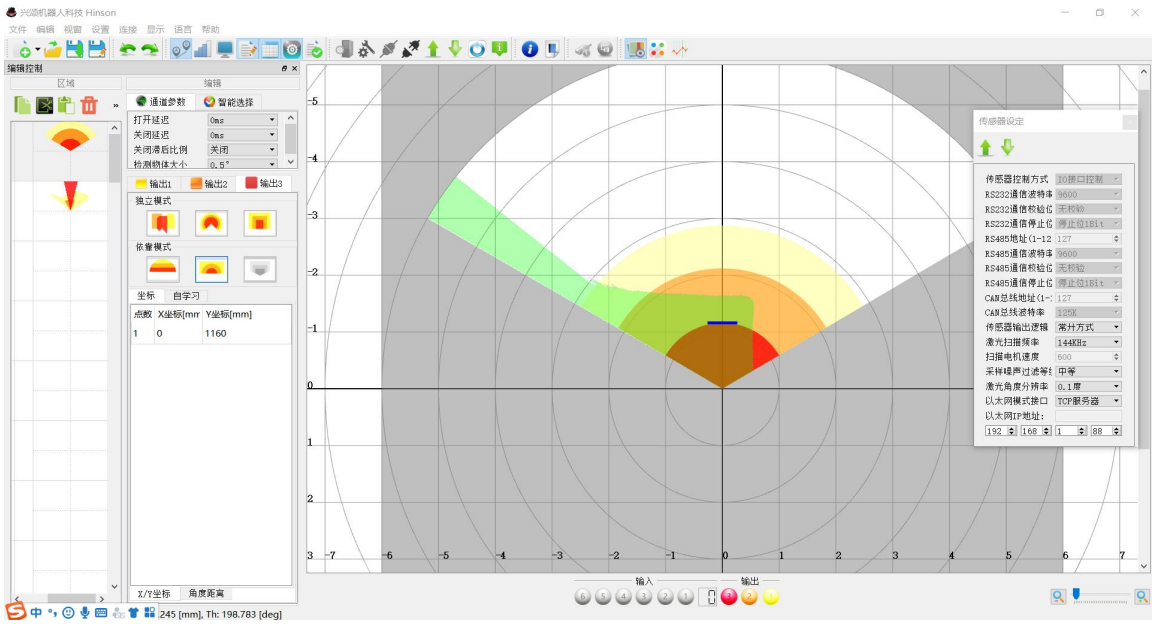




$S = v * \frac{\Delta t}{2}$

S：被测的距离
V：激光飞行的速度
Δt：时间差

The system uses a laser beam to perform a two-dimensional scan of the surroundings to obtain an environmental outline. The protected area is then configured through software. Once an object is within the designated area, the corresponding output port of the sensor outputs a signal. The host computer then receives the signal and makes further judgments and processing.

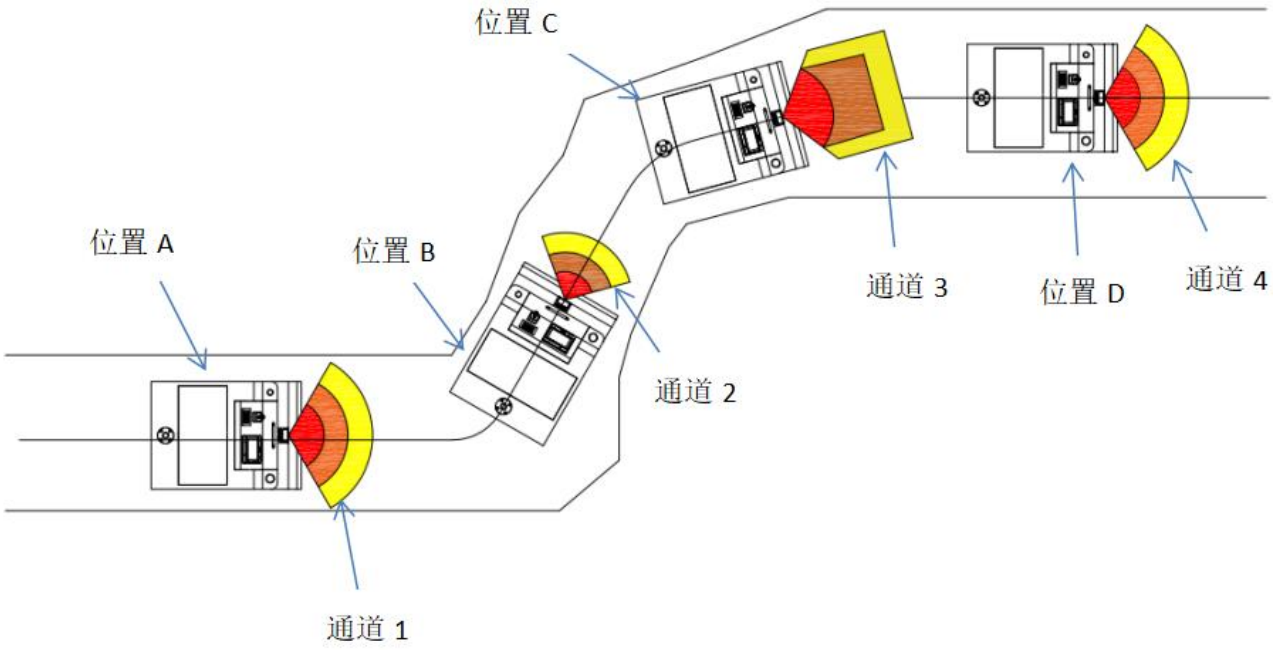


2.3.2 Channel switching

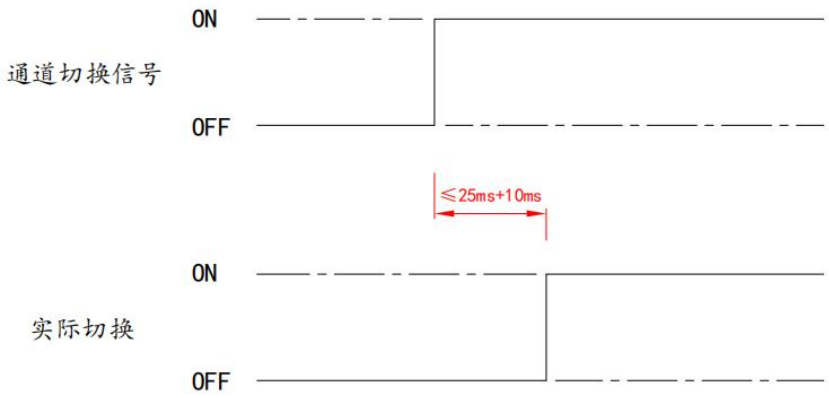
DE-45xxThe maximum number of settings is [number]64Each detection channel can be switched via Ethernet to meet the detection needs of different scenarios.AGVRunning to the lineAWhen positioning, use channels.1Detection of the set sensing range;

whenAGVRunning to the lineBWhen the position changes, the original channel is affected by the external space.1Sensing rangeAGVIf it fails to pass through, switch to a channel with a smaller sensing range setting.2Then you can pass smoothly.

As shown in the picture belowAGVThe usage process is as shown below:



DE-45xxAfter receiving the channel switching signal, due to the switching delay caused by the scanning cycle, the channel switching will not take effect immediately. The switching delay is shown in the figure below:



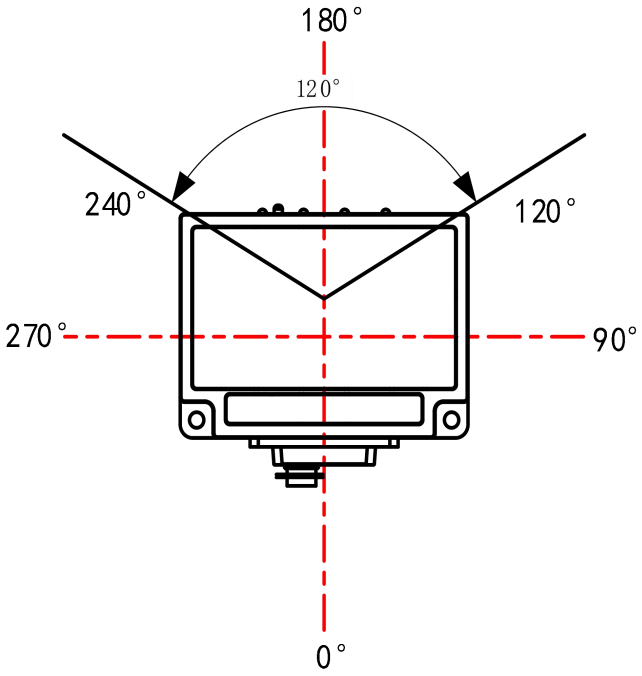
DE-45xxCollect complete120°-240The time of the data is...25ms,DE-45xxAfter receiving the channel switching signal, the process of retrieving the detection image of the channel from memory and parsing it takes no more than [time not specified].10msTherefore fromDE-45xxThe entire process from receiving the channel switching signal to successful channel switching takes ⩽35ms.

Notice

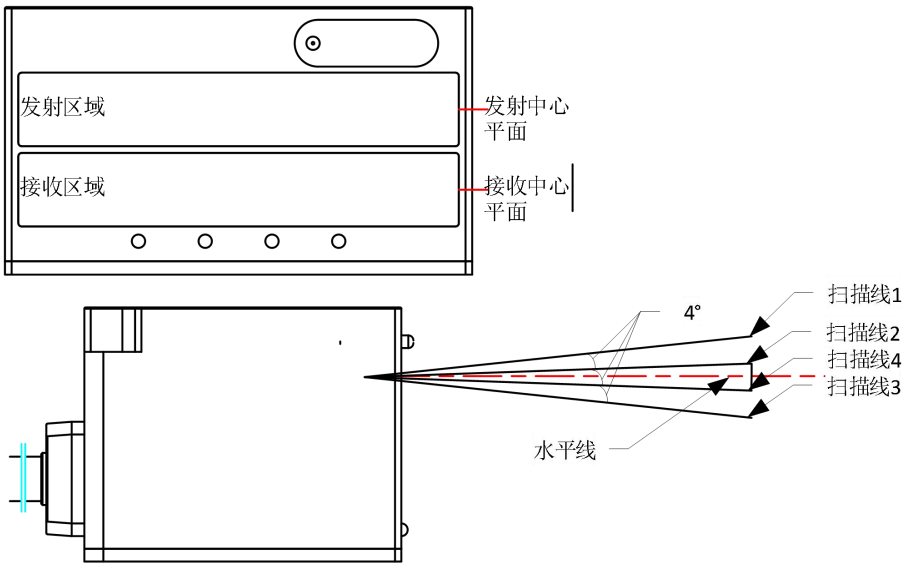
When switching to the no-graphics channel, the sensor will maintain the previous output state with the graphics channel; during this scan cycle (scan cycle is...),25msWhen switching channels within a given timeframe, the output port will retain the state it was in before the channel switch.

2.3.3 Detection range

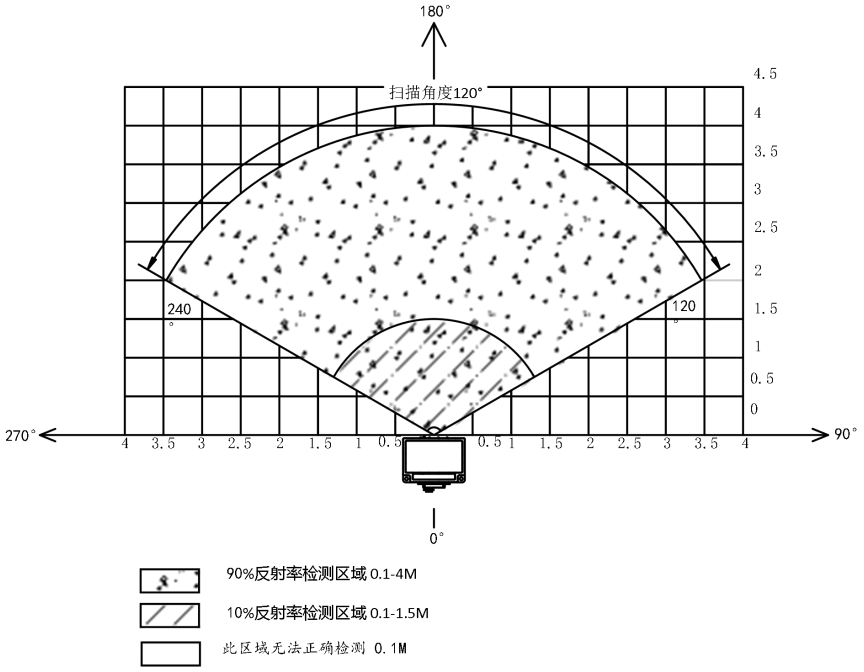
Detection angle: horizontal angle;



Detecting vertical angle

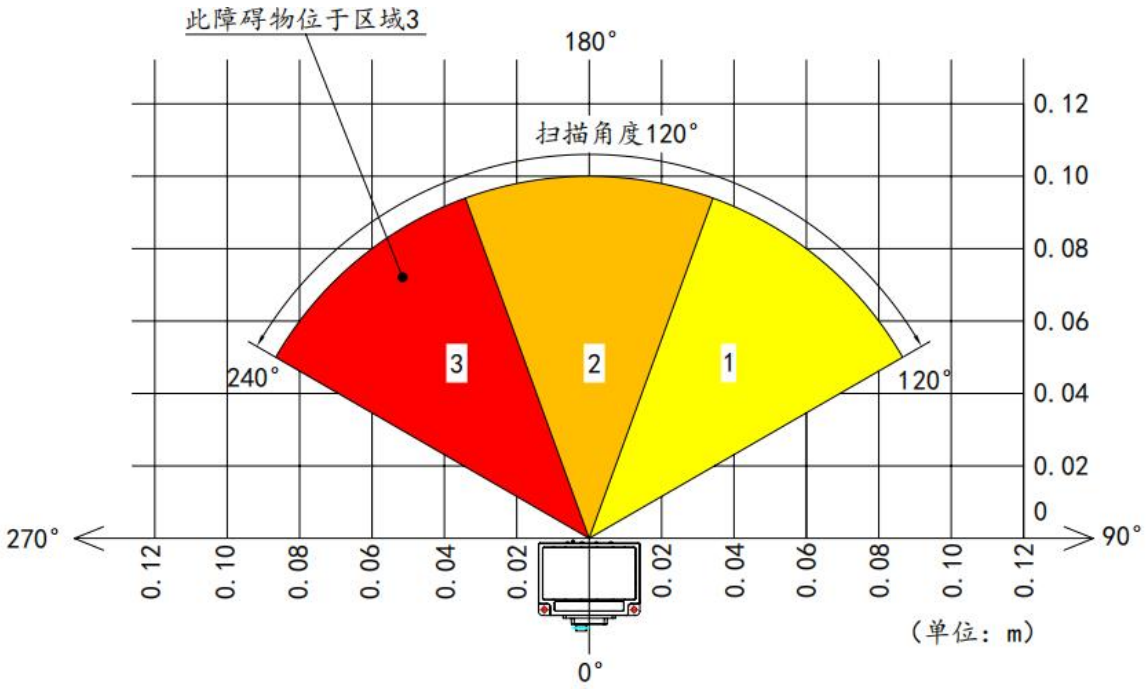


10%and90The detection range for objects with % reflectance is as follows:



0-10cmIt cannot be correctly identified within the range;

Detection area settings

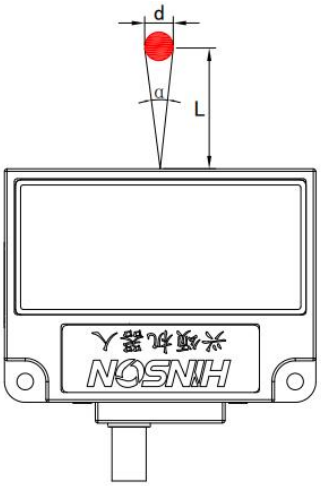


Special note: At an angle of120°, radius is10cmSet output within the range1(warn2(area), output2(warn1(area), output 3(Protected Area), then the obstacle output will occur regardless of which area it is in.1Output2Output3Both have signal output.

2.3.4 The smallest object diameter that can be detected

The sensor contains a rotating mirror, and the laser beam is continuously emitted by the rotating mirror, thus scanning a maximum angle. 120Within a fan-shaped region of °, the emitted laser beam will cover a fan-shaped surface, thus maximizing...120Detect objects within a ° area.

The angular resolution of the sensor is0.5°



$d=2\pi L\frac{\alpha}{360}$

L=被测物体到传感器的距离

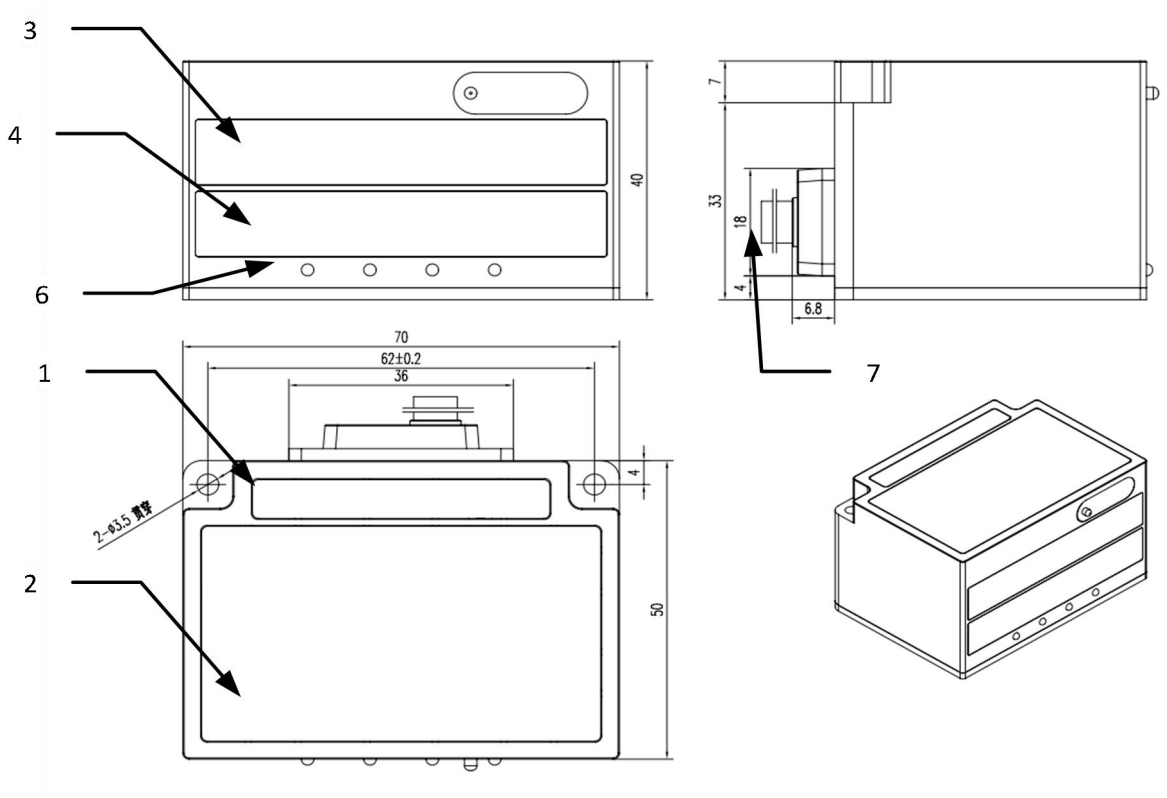
d=被测物体的最小分辨率

α=激光扫描角度分辨率

For example: whenLfor1000mmAt that time, the laser angular resolution was set to0.5At °, the minimum resolution at which objects can be detected is 8.72mm. (4Abandon5After decimal point2Bit).

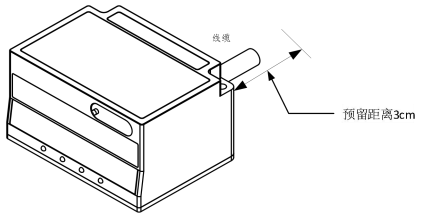
3Install

3.1Dimensions

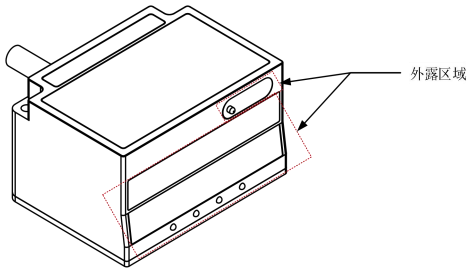


Serial Number	symbol	illustrate	Remark
1	-	Company Label	-
2	-	Line sequence definition label	See details4.1Line definition
3	-	Laser emission area	Please keep this area clean.
4	-	Laser receiving area	Please keep this area clean.
6		Indicator light area	Displays the current sensor status and area detection status.
7	-	Power supply and cables	Sensor output cable

3.2Installation requirements



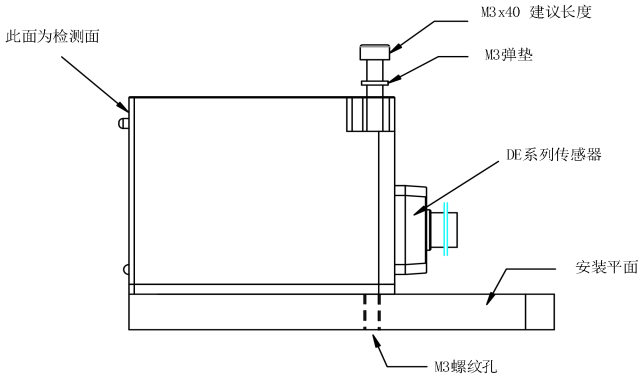
The laser obstacle sensor comes with a cable, and the cable outlet needs to be reserved to avoid excessive bending of the cable.



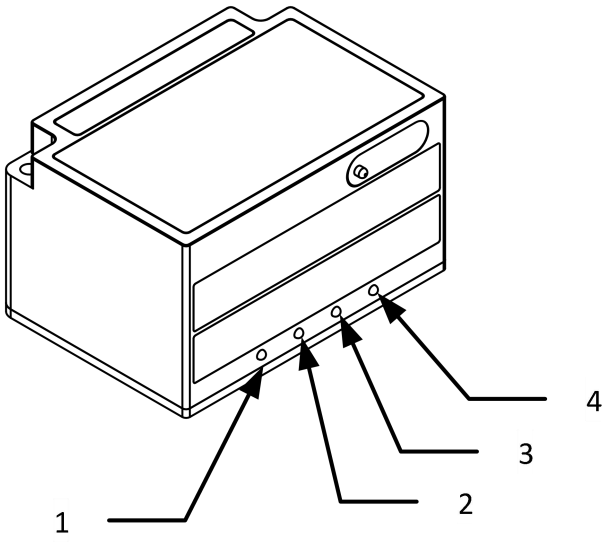
1When installing horizontally, ensure that there are no obstructions on the top and bottom surfaces of the sensor.

2The laser obstacle sensor base should have an indicator light viewing window and a configuration port at the front for easy observation of sensor status and configuration.

(Fixed position)



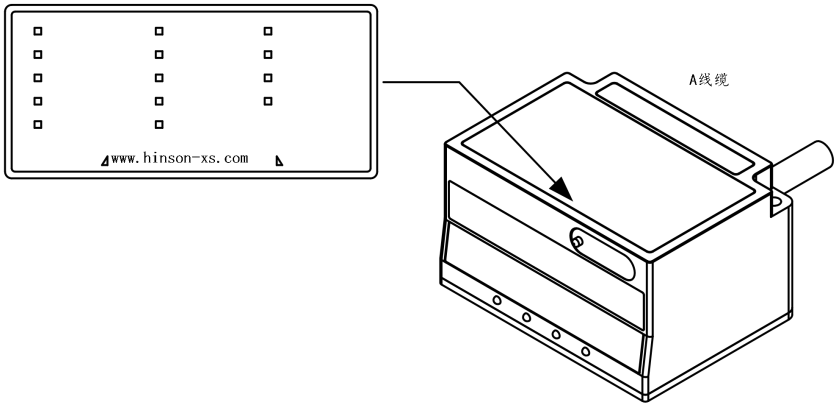
3.3indicator lights



Serial Number	symbol	illustrate	Remark
1	PW	Power/Fault Indicator	When the sensor is powered normally, the power indicator light is on.
			When the sensor malfunctions, the indicator light will flash a corresponding number of times; see details.6.1Fault status
2	Q1	OUT1Output indicator light	Obstacle intrusion warning2The zone indicator light is on (corresponding to the output of the configuration software).1)
3	Q2	OUT2Output indicator light	Obstacle intrusion warning1The zone indicator light is on (corresponding to the output of the configuration software).2)
4	Q3	OUT3Output indicator light	The indicator light for an obstacle intrusion into the protected area is on (corresponding to the output of the configuration software).3)

4Connection

4.1Line definition

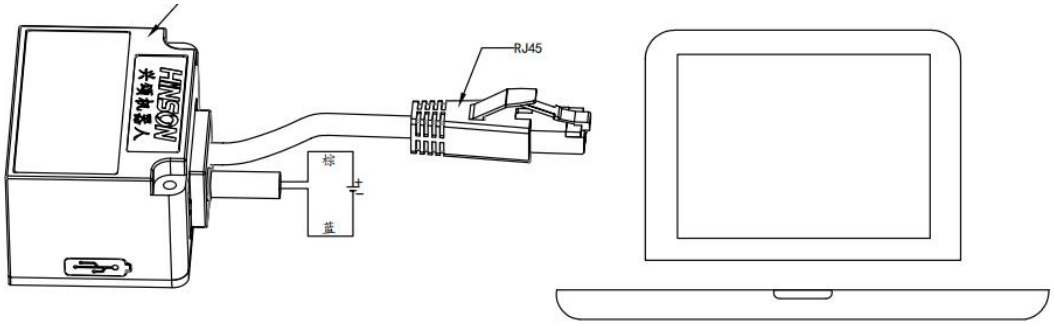


DE-45xxLeading toA/Bcable,A/BCable definitions are as follows:

ACables (power supply and)IOcable)				BCable (Ethernet cable)			
color	signal type	Signal	Function Description	color	signal type	Signal	Function Description
Brown	power supply	VCC	12V-32V	White and red	Enthnet	TX+	Ethernet communicationTX+
blue		GND	negative terminal of power supply	red		TX-	Ethernet communicationTX-
white	Switch input out	OUTCOM	The common output terminal is connected to the negative power supply terminal	White and green		RX+	Ethernet communicationRX+
White and green		OUT1	warn2Zone output	green		RX-	Ethernet communicationRX-
White and blue		OUT2	warn1Zone output	-			
red		OUT3	Protected Area Output				
White and red		ERR OUT	Fault output,DE-45xxWhen there is a malfunction, This port has an output;				

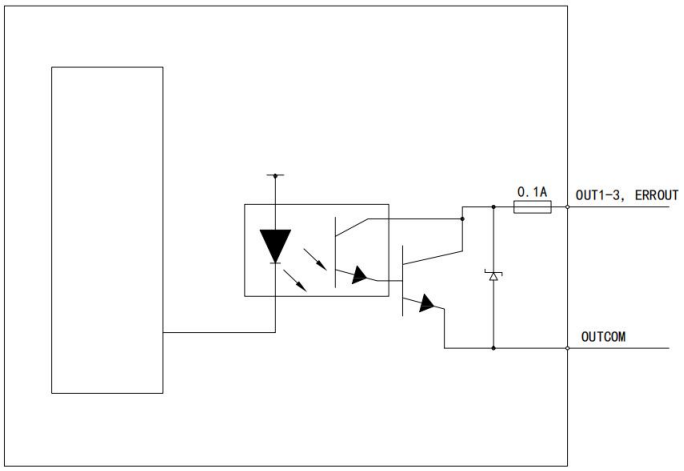
4.2Power connection

Connect to power:DC24V±10%,existAGVWithin the system or other power device networks, an additional one is needed.DC24VVoltage stabilization equipment ensures that interference in the power supply section will not affect the normal operation of the sensor.

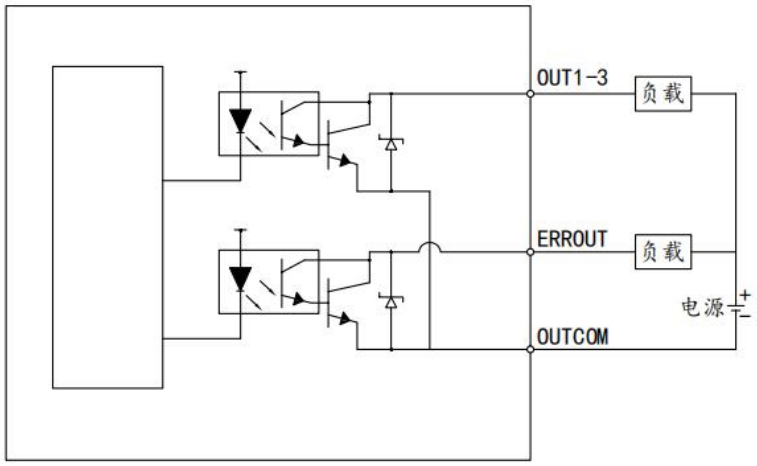


4.3Switch output

DE-45xxThe output port is open collector (NPNThe signal is output with optocoupler isolation; the voltage is [voltage value missing] when a signal is present. 0VThe maximum load capacity of the output port is100mAThe internal circuit diagram is shown below:



Output wiring example:



OUT1Used for remote obstacle detection, corresponding to the configured software.OUT 1When an obstacle enters the area, this port outputs a low voltage.

flat;

OUT2: Used for mid-range obstacle detection, corresponding to the configured softwareOUT2When an obstacle enters the area, this port outputs a low voltage.

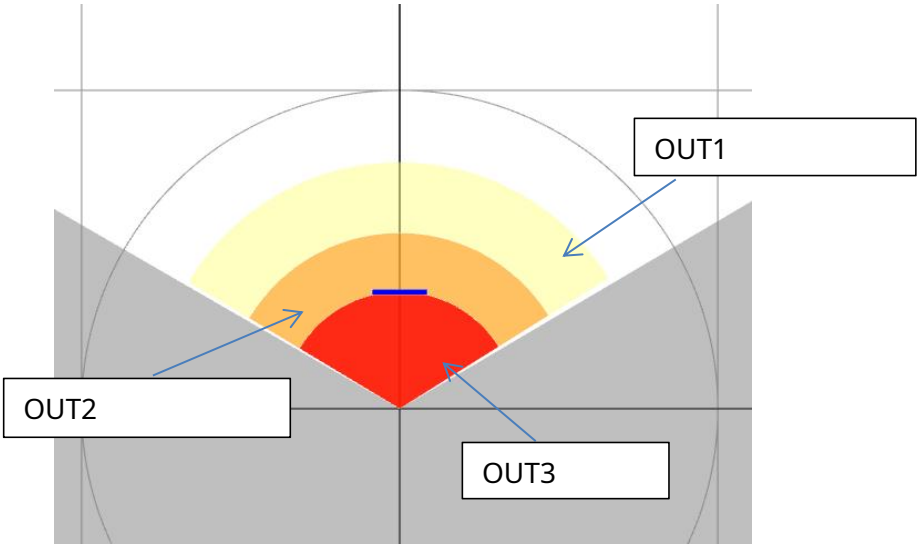
flat;

OUT3Used for near-end obstacle detection, corresponding to the configured software.OUT3When an obstacle enters the area, this port outputs a low voltage.

flat;

ERROUTWhen a fault occurs, this port outputs a low level; Warning.2District, Warning

1The definitions of districts and protected areas are as follows:



Notice

The detection output will only be generated when the corresponding output includes a drawn graphic.

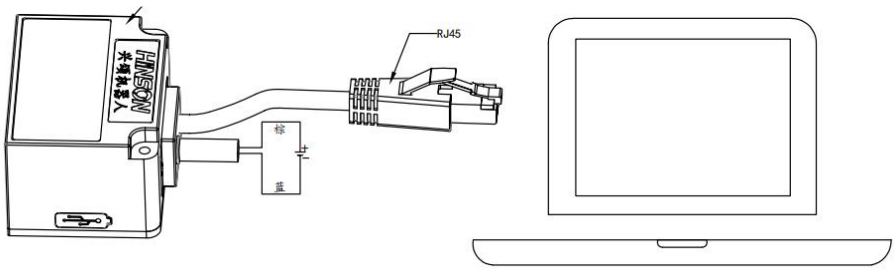
The input and output ports must not be short-circuited or connected to loads exceeding the specified current, otherwise the sensor will be damaged.

5.1connect

5.1.1 Prepare

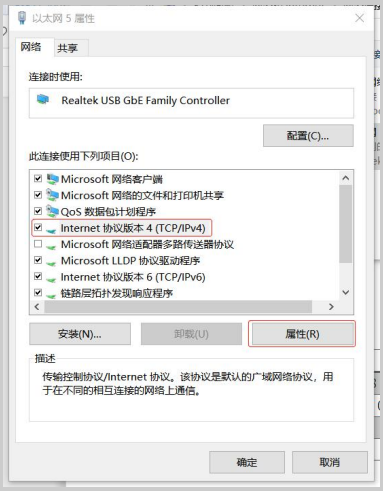
Laser scanning sensor	brand	Xing Song
	model	DE-45xx
DC power supply	Voltage	DC10-30VBoth are acceptable
	Current	1Aabove
computer	system	Windows 7above
	port	EquippedRJ45Interface or equipmentUSBchangeRJ45Network cable interface
	resolution	1280*720above

5.1.2 Sensors connected to computer



5.1.3 Computer Configuration

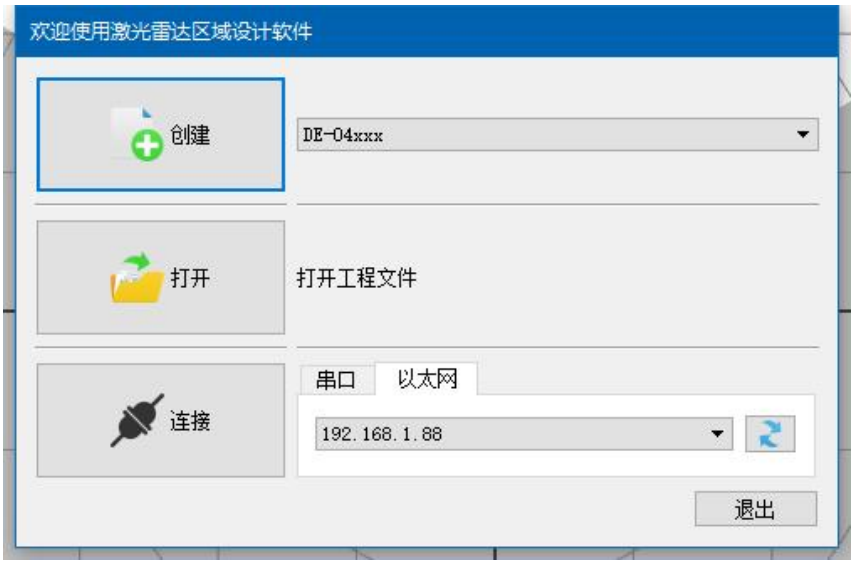
	Open "Control Panel" - "Network and..."InternetNetwork connectivity - Ethernet

	Right-click "Ethernet"5"-"InternetProtocol version4(TCP/IPv4)" - "Attribute"
	set up IPaddress192.168.1.10 Subnet mask255.255.255.0, Cannot be used with sensorsIPThe address is set to default to192.168.1.88 ,repeat;

5.1.4 Sensor connection configuration software

Unzip the configuration software, double-click to enter the "Device List" interface, and then click to enter the following interface:

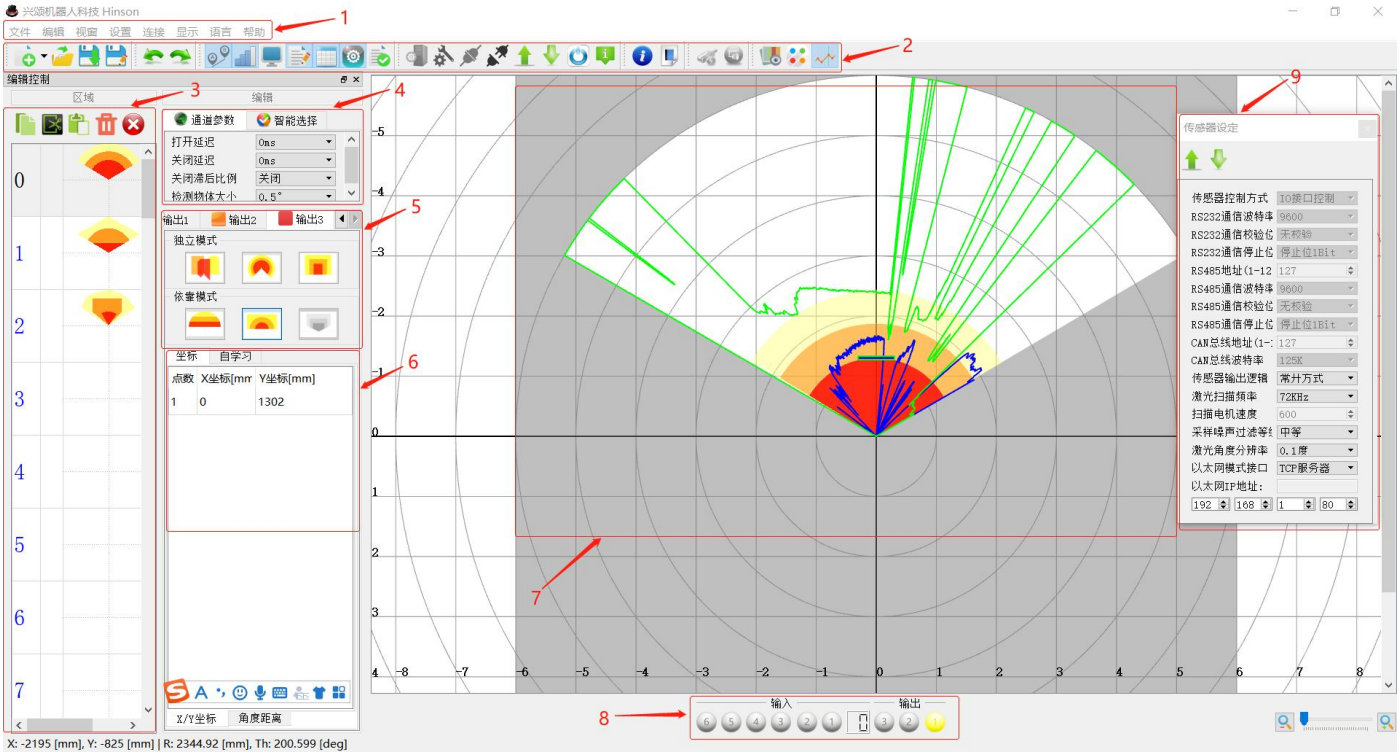
Connect to the configuration software following these steps.



The Ethernet connection is working correctly and the configuration software can recognize it.IPaddress.

5.2Introduction to the configuration software interface

DE-45xxAfter connecting to the configuration software, the following interface will be displayed:



5.2.1 Menu bar

First-level menu	Secondary menu	Level 3 menu	Corresponding icon	Remark
document	New file	-		New file
	Open file	-		Open the created file
	Save file	-		Save the edited file
	Save As	-		Save the edited file as...
	quit	-		Exit the current configuration software interface
edit	Cancel	-		Undo the previous operation
	Redo	-		Restore the previous operation
	copy	-		Copy the detection pattern of a specific detection channel

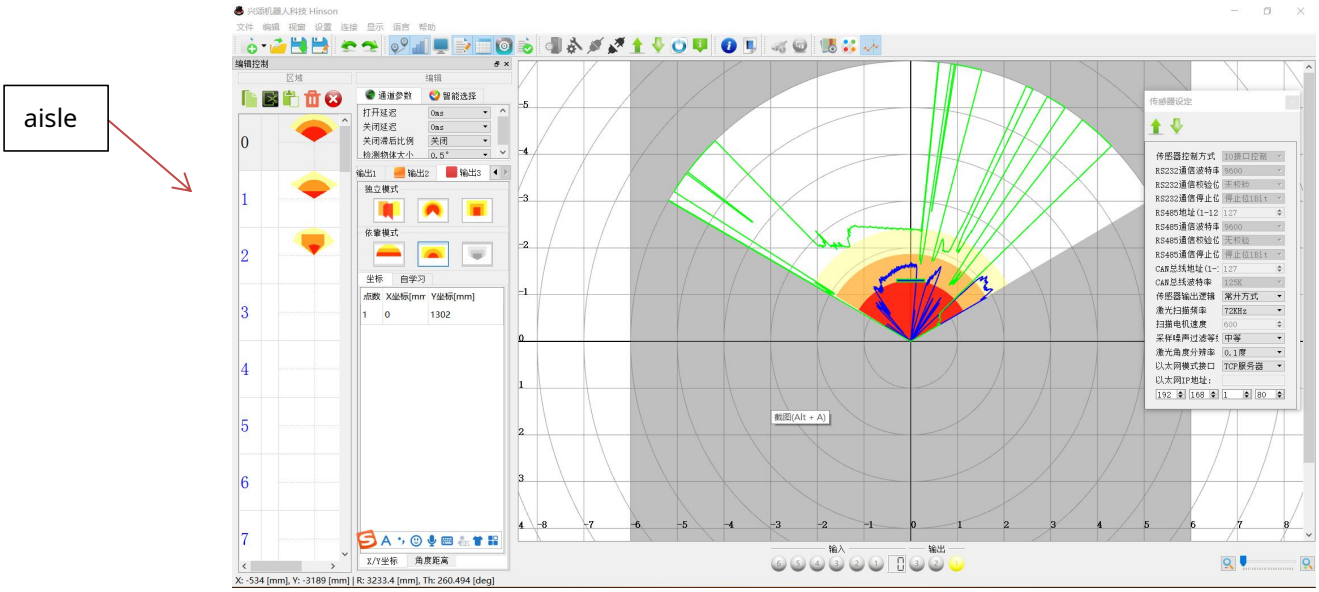
	Cut	-		Cut the detection pattern of a specific detection channel.
	Paste	-		The detection pattern from one detection channel was pasted onto another channel.
	delete	-		Delete the currently selected detection channel image
	Delete all	-		Delete all detection channel graphics

	Application Settings	-		-
Windows	Windows	edit		Click the icon to configure the software to display the edit function box.
		monitor		Click the icon to configure the software to display the monitoring status.
		Sensor settings		Click the icon to configure the software and display the sensor parameter setting function box.
		Input/output simulation		Click the icon to display the sensor input/output simulation function box.
		Self-check status		Click the icon to display the sensor self-test status.
	distance	-		Click to close or show the current sensor status.120Scan profile within ° range
	strength	-		Click to close or show the reflectivity of obstacles.
	Data list	-		The configuration software does not support the output of distance data for all current detection points; this option is unavailable.
set up	serial port	-		The sensor does not support serial port connection configuration software; this option is unavailable.
	Ethernet	-		Click to select Ethernet connection configuration software
	Serial port settings	-		The sensor does not support serial port connection configuration software; this option is unavailable.
	Ethernet settings	-		Click to view the current sensor Ethernet address
connect	interface	serial port		The sensor does not support serial port connection configuration software; this option is unavailable.
		Ethernet		
	Connecting devices	-		Click to connect sensors and configuration software.
	Disconnect device	-		Click to disconnect the sensor and configuration software.

	Upload data	-		Click to upload the sensor's configured detection channel image and parameters.
	Download data	-		Click to download the test channel graphic and various parameters.
	Restart the device	-		After setting the detection channel pattern and its parameters, click this icon to restart the sensor for the parameters to take effect.
	Sensor information	-		-
show	Graphical display	-		Click this icon, sensor120°Scan profile displayed as a planar graphic
	Point cloud display	-		Click this icon, sensor120°Scanned contour displayed as point cloud
	Line display	-		Click this icon, sensor120°Scan outline displayed as lines
language	Simplified Chinese	-		Click this icon to configure the software to display in Chinese.
	English	-		Click this icon to configure the software to display in English.
help	about	-		Click this icon to configure the software to display version information.
	guide	-		-

5.2.2 Graphic editing

DE-45xxsupport0-63Each detection channel supports [number] detection channels.3Output of detection graphics for each detection area.DE-45xxChannel switching and output can be achieved via Ethernet.OUT1,OUT2,OUT3Detect whether there are any obstacles intruding into the detection area.



Channel parameters and intelligent selection

Enable delay:0-500msIt can be configured to allow for a delay time to filter out momentary interference when a transient intrusion causes the sensor to output data.Note that this parameter requires a channel to be selected when setting it; the parameter is invalid if no channel is selected.

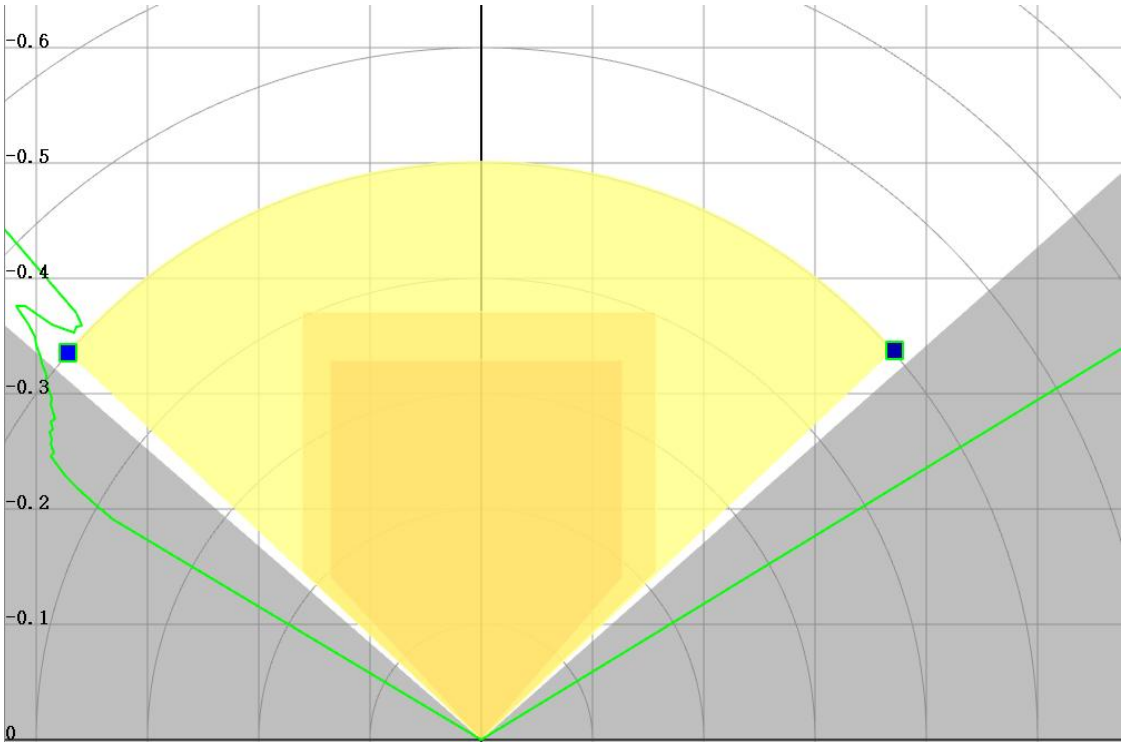
Turn off delay:0-500msThe ability to set a delay for the sensor port to shut down can resolve the issue of frequent switching of the sensor output port caused by obstacles appearing and disappearing intermittently.Note that this parameter requires a channel to be selected when setting it; the parameter is invalid if no channel is selected.

Closure lag ratio:0-10%It can be set to disable the hysteresis ratio when the obstacle jumps around the detection edge, causing frequent changes in the sensor output port. This can solve the problem of frequent changes in the sensor output port.Note that this parameter requires a channel to be selected when setting it; the parameter is invalid if no channel is selected.

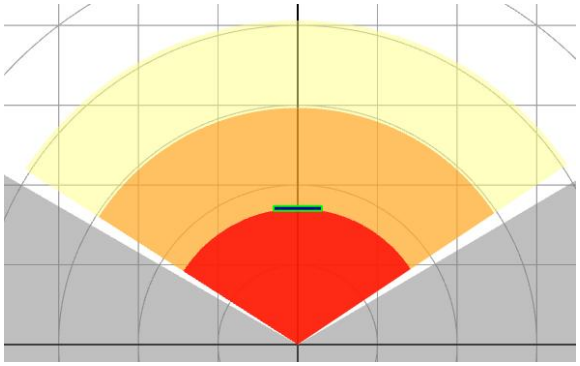
Detecting object size:0.5°-5The size of the object to be detected can be adjusted to reduce false triggering of the sensor caused by dust in the air or unclean sensor detection mirror.Note that this parameter requires a channel to be selected when setting it; the parameter is invalid if no channel is selected.

Output Editing Mode

Output1Output2Output3Independent Drawing Mode: In independent mode, sectors and rectangles can be set separately. Drawings cannot exceed the specified range.120-240°.

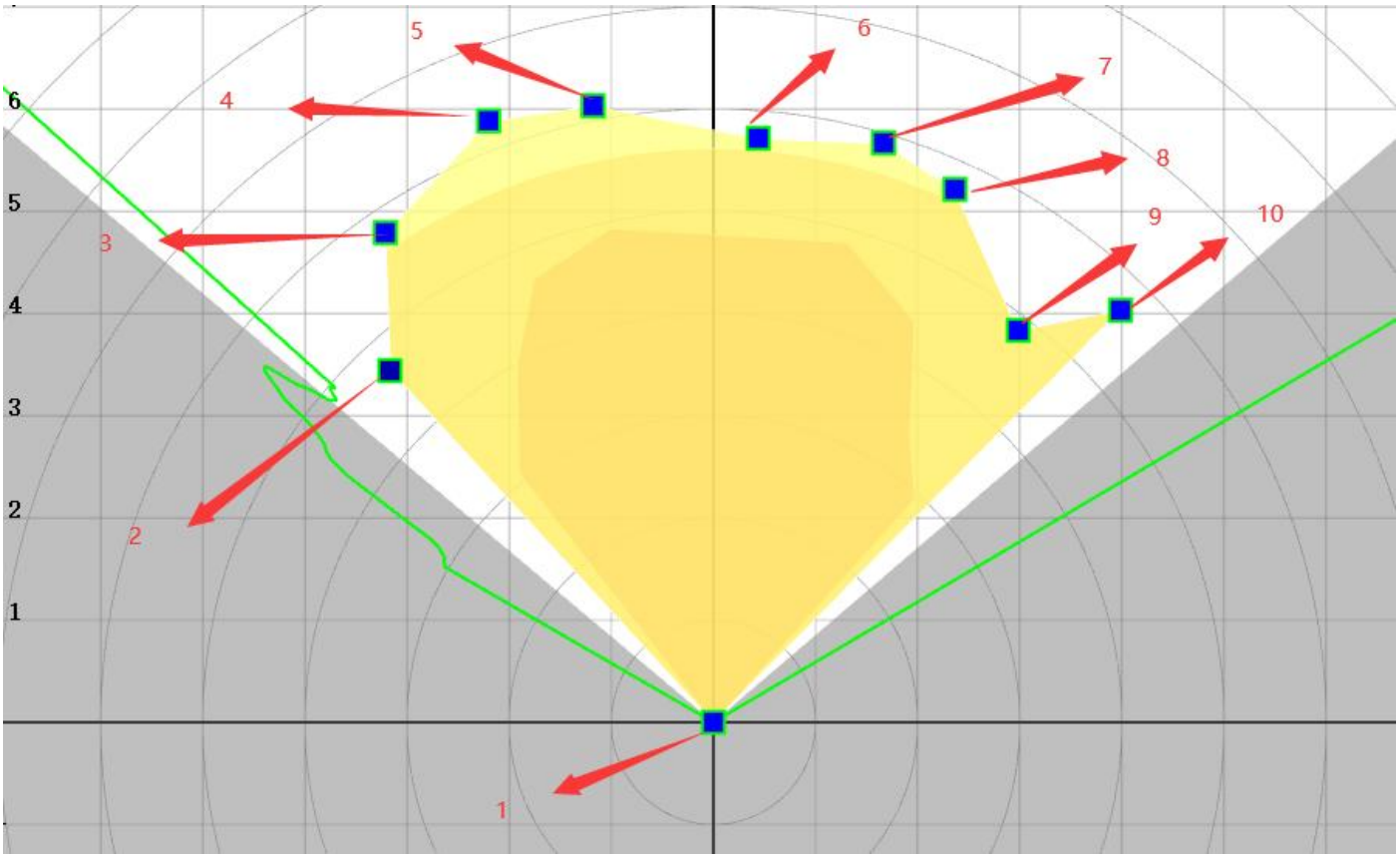


Dependency mode: After setting the output1After obtaining the graphic, you can choose to copy and output it at different scales based on the pattern.1The graphic.



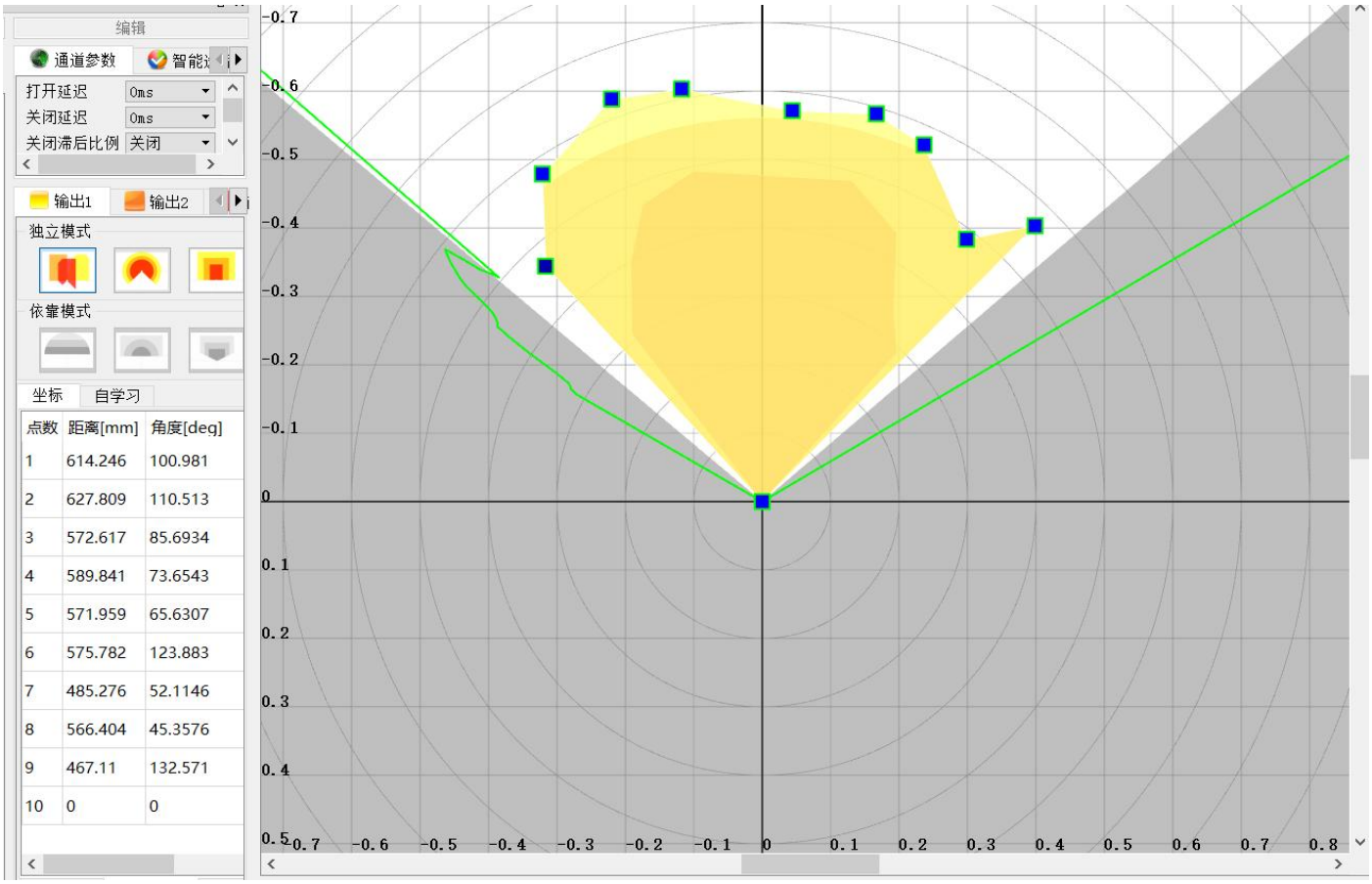
Display of coordinates and their angle values

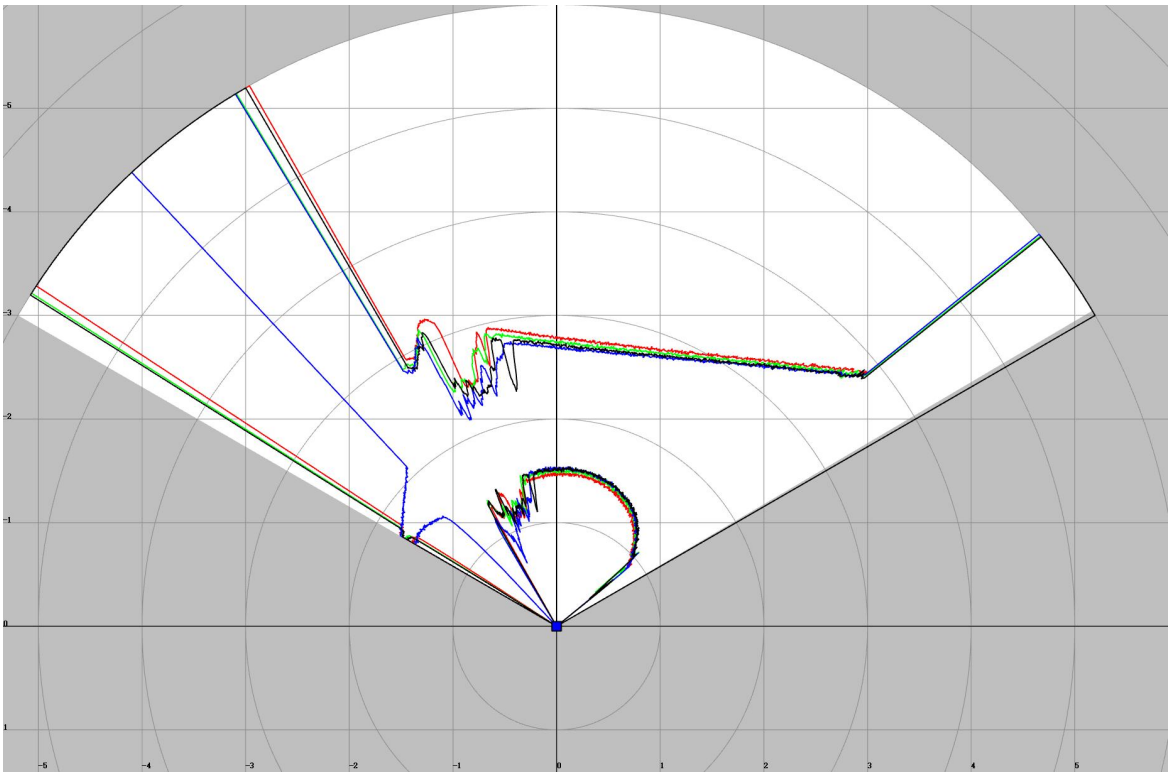
Coordinates of points on an irregular shape in independent mode (X,Y):



Note: The first1The point is the origin of the coordinate system.

In independent mode, the distances and angles between each point of the irregular shape and the origin are as follows:



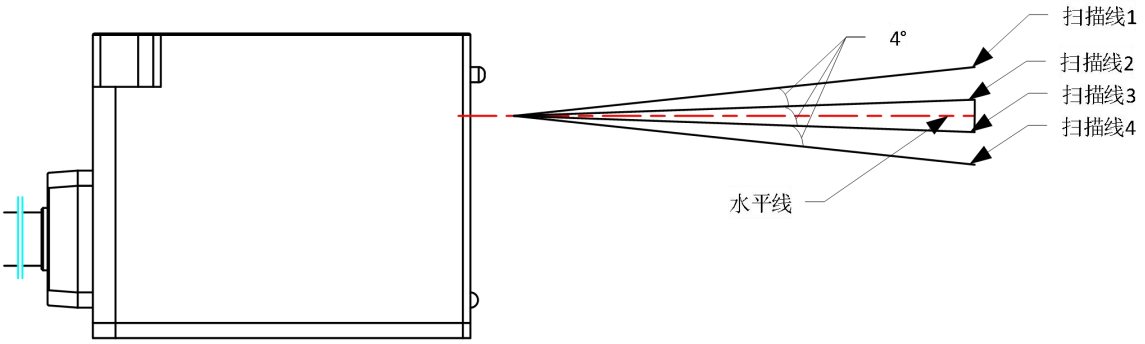


1Scan line number: red;

2Scan line number: Green;

3Scan line number: blue;

4Scan line number: Black;



5.2.3 Sensor parameter settings

Sensor output logic	Normally open Normally closed mode	Sensor output normally open/normally closed setting
Laser scanning frequency	72kHz 144kHz	Laser scanning frequency setting
Noise filtration level adopted	closure Simple medium strict	Detection filtration level settings
Laser angular resolution	0.1° 0.2°	Measurement angle resolution setting
Sensor multi-line selection	Scan lines: 1-4	Set the sensor's active scan line
Ethernet mode interface	TCP server UDP mode	TCPserver
EthernetIPaddress	default 192.168.1.88	192.168.1.1-254 Last byte1-254configurable The sensor (server) port is fixed as8080

6Data Association

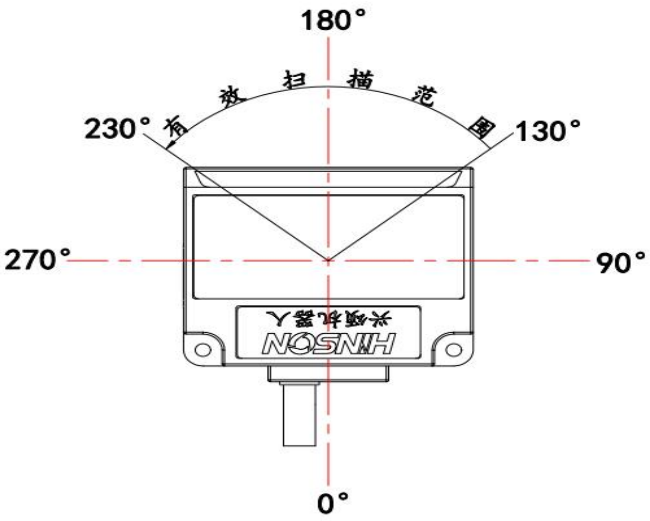
6.1Parameter settings

Open the configuration software, enter the sensor (server-side) settings interface, and configure the settings related to the Ethernet mode.3One parameter.

Parameter name	Parameter value	default value
Ethernet mode interface	TCPserver	TCPserver
	UDPmodel	
EthernetIPaddress	192.168.1.1-254 Last byte1-254configurable The sensor (server) port is fixed as8080	192.168.1.88
Laser angular resolution	0.1°	0.1°
	0.2°	

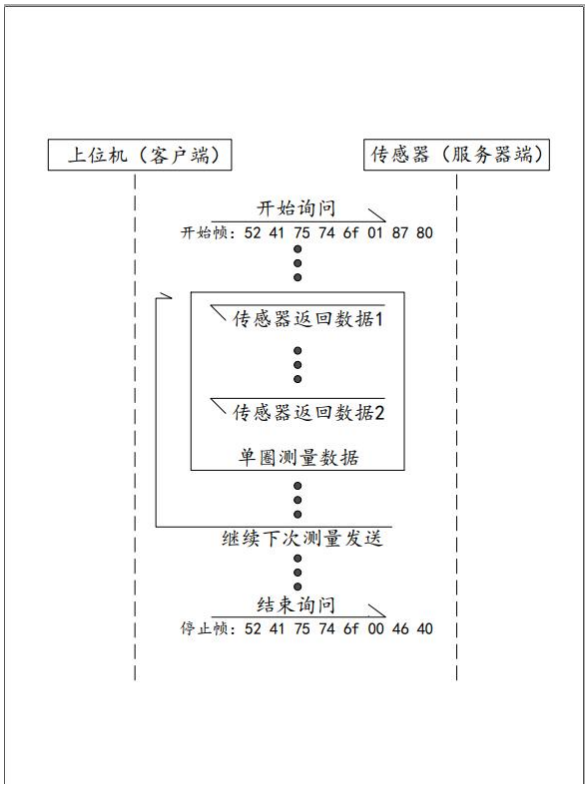
6.2Measurement data acquisition

DE-45xxMeasurement according to a fixed period100The distance to obstacles and their reflective intensity within a ° range, with the starting angle for measurement being:120°, ending angle is240°, angular resolution0.1° and0.2°Settable, total number of measurement points =100/Angular resolution, with the sensor coordinate system as follows:



Sensor scanning120°-240Distance and reflectivity data at °2The data is transmitted in frames. Each frame contains a "start code", "start angle", "end angle", "number of measurement points in the current data frame", and "distance and reflectivity of each detection point". The client reconstructs the distance between each point using the start and end angle values, and the measurement result is the current environment result scanned by the sensor.

After the client initiates a request and establishes a connection, data transmission begins, following the rules below.



The host computer (client) sends a start data frame to the sensor (server), and the sensor divides...2Frame return120°-240The measurement data of ° is returned in full.120°-240After receiving the measurement data at °, the sensor continues to send the next measurement data until the sensor receives...

Until a stop data frame is received from the host computer.

2.1Send to obtain measurement data

-Start Data Frame (Hex)

0x52 0x41 0x75 0x74 0x6F 0x01 0x87 0x80 After the host computer sends a start frame to the sensor, the sensor returns measurement data.

6.2.2The sensor returns measurement data

-Measurement data frame (Hex)

1	2	3		4		5		6
start code	Scan line number	Starting angle		End angle		Number of measurement points		Measurement data
5 Byte	1 Byte	H	L	H	L	H	L	(Number of measurement points*)4) Byte
		2 Byte		2 Byte		2 Byte		

The measurement data frame for each lap is2A frame is a data unit with a fixed length, as illustrated in the examples below. 1, start code (Hex):

0x43 0x6C 0x6F 0x75 0x64 2

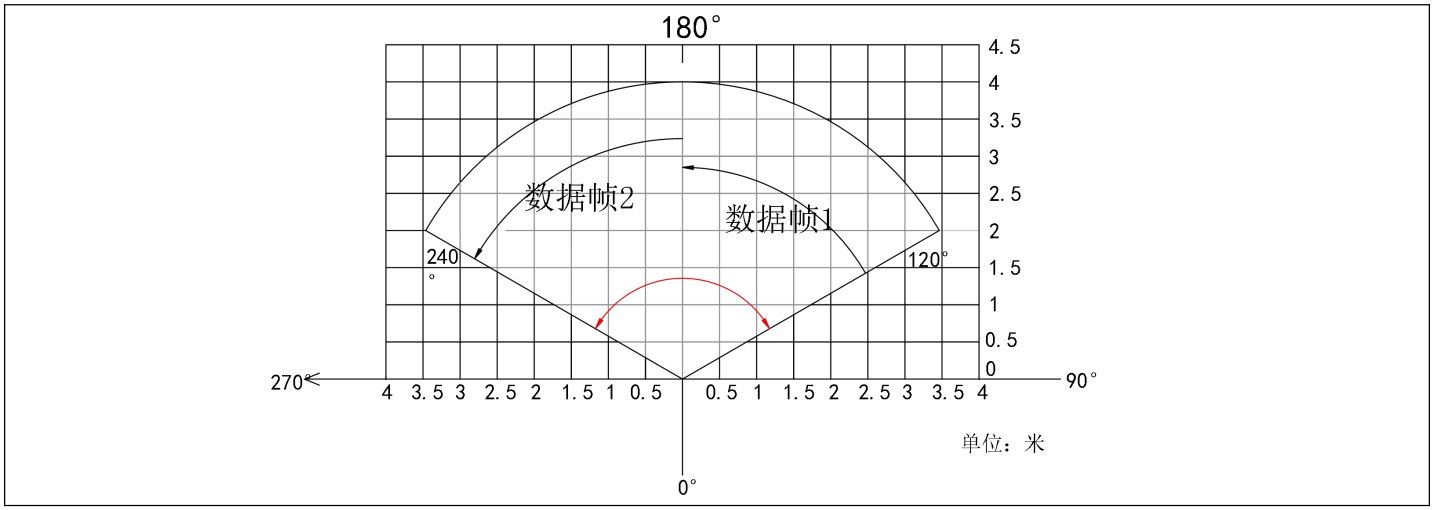
Scan line number (Hex):

01-04This represents the scan line number that the data in this frame represents;

3Starting angle (Hex):

The angle currently being measured is the smallest.120°, high position first, low position second; 4Ending angle (Hex):

The current angle at which the measurement ends is the maximum.240°, high position first, low position second; 120 °-240°Data Analysis2Frame returned,120°、240The position is defined as shown in the following figure:



5Number of measurement points (Hex):

The number of measurement points is related to the starting angle, ending angle, and laser angular resolution. The formula is: Number of measurement points = (Ending angle - Starting angle) / Laser angular resolution. The following table provides an example.

Starting angle	120°	180°	120°	180°
End angle	180°	240°	180°	240°
Laser angular resolution	0.1°	0.1°	0.2°	0.2°
Number of measurement points	500	500	250	250

6Measurement data (Hex):

First point measurement data (4 bytes)				Second point measurement data (4 bytes)				..... (4 bytes)				Measurement data of the last point (4 bytes)			
Measuring distance (2 bytes)		Measuring intensity (2 bytes)		Measuring distance (2 bytes)		Measuring intensity (2 bytes)		Measuring distance (2 bytes)		Measuring intensity (2 bytes)		Measuring distance (2 bytes)		Measuring intensity (2 bytes)	
L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H

The unit for measuring distance ismmThe output is the distance data between the reflection point and the sensor; the measured intensity is the reflection intensity of the reflection point, and the higher the value, the stronger the object's reflectivity; both the measured distance and intensity are displayed with the lower digit first and the higher digit second.

-Stop data frame (Hex)

0x52 0x41 0x75 0x74 0x6F 0x00 0x46 0x40 After the host computer sends a stop data frame to the sensor, the sensor stops returning measurement data.

6.2.3 For example

1The sensor parameters are set as follows;

Ethernet mode interface:TCPserver

EthernetIPaddress:192.168.1.88

Laser angular resolution:0.1°

It is important to note that the sensor (server) port is fixed at...8080The host computer successfully established a connection with the sensor.

↓

2The host computer sends a start data frame to the sensor.HexThe starting data frame is0x52 0x41 0x75 0x74 0x6F 0x01 0x87 0x80

↓

3The sensor returns measurement data frames to the host computer.Hex

Measurement data frame1Scan lines2Measurement data

Starting angle120°, Ending angle180°, Number of measurement points = (180-120)/0.1 = 500Measurement data returned2000 Byte.

1	2	3		4		5		6
start code	scanning Line number	Starting angle		End angle		Number of measurement points		Measurement data
0x43 0x6C 0x6F	02	H	L	H	L	H	L	xx xx xx xx ...xx xx xx xx
0x75 0x64		00 82		00 B4		01 F4		Measurement data returned500 * 4 Bytes = 2000 Bytes

Measurement data frame2:

Starting angle180°, Ending angle240°, Number of measurement points = (240-180)/0.1 = 500Measurement data returned2000 Byte.

1	2	3		4		5		6
start code	scanning Line number	Starting angle		End angle		Number of measurement points		Measurement data
0x43 0x6C 0x6F	02	H	L	H	L	H	L	xx xx xx xx ...xx xx xx xx
0x75 0x64		00 B4		00 E6		01 F4		Measurement data returned500 * 4 Bytes = 2000 Bytes

↓

4The sensor continues to return measurement data frames to the host computer.Hex)

↓

.

.

.

↓

5The host computer sends a stop data frame to the sensor.Hex) 52 41 75 74 6F 00 46 40

↓

6The sensor stops returning measurement data.

6.3Status data acquisition

The following protocol obtains the current status information of the sensor.

6.3.1 Send to get status data

Data identifier	5 Byte
Sensor operating modes	1 Byte
Sensor channel values	1 Byte
Intelligent channel selection mode Switching angle value	2 Byte
Intelligent channel selection mode Switching speed value	2 Byte
Channel group number	2 Byte
Invalid data bits	3 Byte
Check bit	2 Byte

-Data Identifier (5 bytes)

The identifier is fixed data:0x57 0x53 0x69 0x6d 0x75This data function;

-Sensor operating modes (1 byte) 00

Invalid instruction

01Channel specification mode

02Intelligent channel selection mode

-Sensor channel values (1 byteControls the current sensing channel used by the sensor, and the data range.00-63;

-Sensor through angle (2 bytesAngle values in channel group mode; data is a signed data range.180-180;

-Sensor channel speed value (2 bytesSpeed values in channel group mode; data is a signed data range.300-300;

-Sensor channel group number (2 bytesThe current sensing channel group number and data range used by the control sensor are specified.00-04;

-Invalid data (3 bytes)

Invalid data; default data must be sent.0x00;

-Check digit (2 bytes)

Data check bit, usingmodbusLow position firstCRC16Verification method. The verification value is calculated using the verification formula; see the appendix for details on the calculation method.

6.3.2 Sensor returns status data

Data identifier	5 Byte
Sensor channel values	1 Byte
Invalid data	1 Byte
IOPort output status	1 Byte
Invalid data	1 Byte
Fault status	2 Byte
Invalid data	10 Byte
Check bit	2 Byte

-Data Identifier (5 bytes)

The identifier is fixed data:0x57 0x53 0x69 0x6d 0x75This data function;

-Current channel value (1 byteCurrent

channel value of the sensor0-15;

-Invalid data (1 byte)

Invalid data;

-Output status (1 byte)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
invalid					OUT3	OUT2	OUT1

With parameter settings **Sensor output logic** Related:

Normally closed mode (default)

00Object detected;

01No object detected

Normally open

01Object detected;

00No object detected;

-Invalid data (1 byte)

Invalid data;

-Sensor fault status (2 bytesDisplays the current status of the sensor, with

values ranging from [value range missing].00-07;

00Sensor in normal condition;

01-07Sensor malfunction status;

-Invalid data (10 bytes

Invalid data;

-Check digit (2 bytes)

Data check bit, usingmodbusLow position firstCRC16Verification method. The verification value is calculated using the verification formula; see the appendix for details on the calculation method.

6.4Firmware information acquisition data

Get current sensor version information

6.4.1 Send to retrieve data

Data identifier	5 Byte
Check bit	2 Byte

-Data Identifier (5 bytes)

The identifier is fixed data:0x52 0x50 0x72 0x64 0x61This data function;

-Check digit (2 bytes)

Data check bits,0xC7 0xFF

6.4.2 Sensor version data

Data identifier	5 Byte
Sensor type	2 Byte
Firmware version number	2 Byte
Sensor serial number	2 Byte
Production year	2 Byte
Production Month	2 Byte
Production Day	2 Byte
Invalid data	494 bytes

-Data Identifier (5 bytes)

The identifier is fixed data:0x52 0x50 0x72 0x64 0x61This data function;

-Sensor type (2 bytes

Fixed data;

-Firmware version number (2 bytes)

Data according to16The version number is read and parsed as decimal data. For example, when reading data...0x00 0x64Decimal100,Version number V.1.0.0Version;

-Sensor serial number (2 bytes)

Current sensor serial number, data according to16Read the version number and parse it as decimal data;

-Production year (2 bytes)

Current sensor production year, data according to16Read the version number and parse it as decimal data;

-Production Month (2 bytes)

Current sensor production month, data range1-12The data is according to16Read the version number and parse it as decimal data;

-Production Day (2 bytes)

Current sensor production day, data range1-31The data is according to16Read the version number and parse it as decimal data;

-Invalid data (494 bytes

Invalid data, meaningless;

6.5 CRCcheck

ClanguageCRCValidation function

cBuffer:calculateCRCAn array of checksums.

iBufLen: The length of the array.

```
unsigned int CRC_Verify(unsigned char *cBuffer, unsigned int iBufLen)
{
unsigned int i, j; //#define wPolynom 0xA001
unsigned int wCrc = 0xffff;
unsigned int wPolynom = 0xA001; /
*------------------------------------------------------------------------------*/ for (i =
0; i < iBufLen; i++)
{
wCrc ^= cBuffer[i];
for (j = 0; j < 8; j++)
{
if (wCrc &0x0001)
{ wCrc = (wCrc >> 1) ^ wPolynom; }
else
{ wCrc = wCrc >> 1; }
}
}
return wCrc;
}
```

7Troubleshooting

7.1Fault status

DE-45xxThe power indicator light will show a fault when it is green.ledThe sensor will stop outputting signals when it is flashing.

ledNumber of flashes	Fault Description	deal with
Chang Liang	Normal state	
blinking	Sensor fault status	1Restart the sensor; 2The error persists after restarting; the sensor has been replaced. 3Contact after-sales personnel

7.2 troubleshooting

DE-45xxIf the system is not functioning properly or its status is uncertain, follow the steps below to troubleshoot and confirm the problem.

Fault	solve
Unable to detect object	Use the configuration software to view and monitor the current channel status and the drawn detection area;
Channel cannot be switched	Check whether the sensor correctly receives the channel switching command;
Output signal flashing	(1When the sensing range is at a critical point, the output port may become unstable. If necessary, the protection range should be expanded. (2Dust is present in the sensor detection window;
Power indicator light flashing	Contact our company

8.1Warranty period

DE-45xxWe offer a limited warranty period. If the product cannot be used normally due to quality problems or design defects during the warranty period, we will provide free after-sales maintenance.

■ Warranty period: From the date of sale2Year.

8.2Warranty Scope

If the product is within the warranty period and falls within the warranty coverage, we will repair or replace it free of charge.

- This product's warranty and after-sales service are limited to mainland China only.
- The product cannot be used normally due to being opened during transportation;
- The product itself is malfunctioning due to damaged components.
- Product design flaws prevent normal use;

8.3Disclaimer

Please note the following conditions during product use: we will not provide free after-sales service or warranty.

■ The product was damaged due to improper installation according to the instructions;

■ Using this product in unsuitable environments and conditions may cause damage to the product;

■ Damage to the product caused by failure to follow the product instruction manual;

■ Unauthorized disassembly or repair of products without the company's permission;

■ Product damage caused by natural disasters, fires, or other irresistible external forces.

8.4Technical Support

Guangdong Xingsong Technology Co., Ltd.

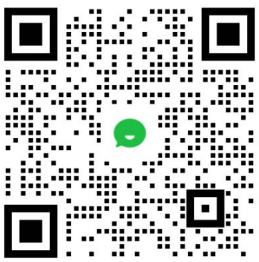
Telephone: 0757-22218956 (Weekdays 8:30-17:30)

Website:www.hinson-xs.com

Email: hinson@hinson-xs.com

Technical SupportQQ:2636178756

微信扫码咨询客服



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